

## CLAIMS

What is claimed is:

1           1.       A power control system for a power amplifier, comprising:  
2           a first power control loop comprising:  
3                 a variable attenuator for adjusting a gain applied to a signal in the first  
4           power control loop;  
5                 a detector for providing a direct current (DC) baseband signal representing  
6           an output of the power amplifier;  
7                 a first comparator for comparing the DC baseband signal to a first  
8           reference signal and generating an error signal;  
9           a second power control loop comprising:  
10                a second comparator for comparing the error signal to a second reference  
11           signal and generating a secondary control signal capable of controlling the variable  
12           attenuator.

1           2.       The power control system of claim 1, wherein the secondary control signal  
2           is used to control the variable attenuator to reduce attenuation in the first power control  
3           loop.

1           3.       The power control system of claim 2, wherein the variable attenuator is a  
2           variable gain amplifier (VGA) having a maximum gain of zero dB.

1           4.       The power control system of claim 1, further comprising an adjustable  
2           buck voltage converter responsive to the secondary control signal, the adjustable buck  
3           voltage converter configured to reduce a power supplied to the power amplifier in  
4           response to the secondary control signal.

1           5.     The power control system of claim 4, wherein the adjustable buck voltage  
2 converter reduces supply current to the power amplifier until saturation of the power  
3 amplifier is detected.

1           6.     The power control system of claim 1, wherein the secondary control signal  
2 is used to control the variable attenuator to reduce attenuation in the first power control  
3 loop, and further comprising:

4                 an adjustable buck voltage converter responsive to the secondary control signal,  
5 the adjustable buck voltage converter configured to reduce the power supplied to the  
6 power amplifier in response to the secondary control signal until saturation of the power  
7 amplifier is detected.

1           7.     A method for operating a power control loop for a power amplifier,  
2 comprising:

3                 measuring a power level of a signal output from the power amplifier;  
4                 generating an error signal by comparing the power level of the signal output from  
5 the power amplifier to a first reference signal; and  
6                 deriving a secondary control signal.

1           8.     The method of claim 7, further comprising:  
2                 using the secondary control signal to control a gain applied to the signal output  
3 from the power amplifier.

1           9.     The method of claim 8, wherein the gain applied to the signal output from  
2 the power amplifier is controlled by a variable attenuator, the variable attenuator  
3 configured to receive the signal output from the power amplifier.

1           10.     The method of claim 7, further comprising:  
2           using the secondary control signal to control an adjustable buck voltage converter,  
3     the adjustable buck voltage converter configured to provide a supply current to the power  
4     amplifier.

1           11.     The method of claim 10, wherein the adjustable buck voltage converter  
2     reduces supply current to the power amplifier until saturation of the power amplifier is  
3     detected.

1           12.     The method of claim 7, further comprising:  
2           using the secondary control signal to control a gain applied to the signal output  
3           from the power amplifier; and  
4           using the secondary control signal to control an adjustable buck voltage converter,  
5           the adjustable buck voltage converter configured to provide a supply current to the power  
6           amplifier, wherein the adjustable buck voltage converter reduces supply current to the  
7           power amplifier until saturation of the power amplifier is detected.

1           13.     A system for operating a power control loop for a power amplifier,  
2           comprising:  
3           means for measuring a power level of a signal output from the power amplifier;  
4           means for generating an error signal by comparing the power level of the signal  
5           output from the power amplifier to a first reference signal; and  
6           means for deriving a secondary control signal.

1           14.     The system of claim 13, further comprising:  
2           means for using the secondary control signal to control a gain applied to the signal  
3           output from the power amplifier.

1           15.     The system of claim 14, wherein the gain applied to the signal output from  
2           the power amplifier is controlled by a variable attenuator means, the variable attenuator  
3           means for receiving the signal output from the power amplifier.

1           16.     The system of claim 13, further comprising:  
2           means for using the secondary control signal to control an adjustable buck voltage  
3           converter means, the adjustable buck voltage converter means for providing a supply  
4           current to the power amplifier.

1           17.    The system of claim 16, wherein the adjustable buck voltage converter  
2 means reduces supply current to the power amplifier until saturation of the power  
3 amplifier is detected.

1           18.    The system of claim 13, further comprising:  
2           means for using the secondary control signal to control a gain applied to the signal  
3 output from the power amplifier; and  
4           means for using the secondary control signal to control an adjustable buck voltage  
5 converter means, the adjustable buck voltage converter means for providing a supply  
6 current to the power amplifier, wherein the adjustable buck voltage converter means  
7 reduces supply current to the power amplifier until saturation of the power amplifier is  
8 detected.